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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,767	11/12/2003	Eugen Unger	20195/0200498-US0	7403
7278	7590	05/04/2005	EXAMINER	
DARBY & DARBY P.C. P. O. BOX 5257 NEW YORK, NY 10150-5257			NOVACEK, CHRISTY L	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/712,767	<b>Applicant(s)</b> UNGER ET AL.	
	<b>Examiner</b> Christy L. Novacek	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 22-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22,23 and 26-42 is/are rejected.
- 7) ☒ Claim(s) 24 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/12/04</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This office action is in response to the preliminary amendment filed September 10, 2004.

#### ***Specification***

The disclosure is objected to because of the following informalities:

At lines 1-2 on page 17 of the substitute specification, "323" should be replaced with "313" and "321" should be replaced with "311" to be in accordance with the drawings (Figure 3B).

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 22, 23, 26-29 and 31-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Awano (US 20020163079).

Regarding claims 22 and 32, Awano discloses forming a first nanoelement, covering the first nanoelement in a predetermined region with a catalyst material for catalyzing growth of nanoelements, and growing a second nanoelement on the catalyst material (Fig. 5A-6; para. 0088-0097).

Regarding claim 23, Awano disclose the catalyst material is applied to the first nanoelement in the form of a cluster.

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Regarding claim 26, Awano discloses growing a second nanoelement on the cluster.

Regarding claim 27, Awano discloses that the second nanoelement is formed by a chemical vapor deposition process.

Regarding claims 28 and 31, Awano discloses that the catalyst material between the first and second nanoelements can be nickel-plated.

Regarding claim 29, Awano discloses that a partial region of the first nanoelement may be covered with a protective layer which has no catalytic action for the growth of nanoelements (para. 0076 and 0097).

Regarding claim 33, Awano discloses that only a portion of the first nanoelement is covered with catalyst material for catalyzing the growth of nanoelements.

Regarding claim 34, Awano discloses that the first nanoelement may be grown in a pore introduced structure (para. 0097).

Regarding claim 35, Awano discloses that the first nanoelement may be grown in the pore on a metallization plane in the substrate (para. 0075-0076).

Regarding claim 36, Awano discloses that the second nanoelement is grown on top of the first nanoelement and additional nanoelements may be grown thereon.

Regarding claim 37, Awano discloses that the first and second nanoelements include nanotubes/nanorods.

Regarding claim 38, Awano discloses that the nanorod may include a metal (para. 0081).

Regarding claim 39, Awano discloses that the nanotube is a carbon nanotube.

Regarding claim 40, Awano discloses that the first and second nanoelements may be carbon nanotubes and the catalyst may include nickel, cobalt or iron (para. 0076).

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Regarding claim 41, Awano discloses an integrated circuit coupled to the first and second nanoelement.

Regarding claim 42, Awano discloses that the nanoelements form a branched network (Fig. 6).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Awano (US 20020163079).

Regarding claim 30, Awano discloses that the protective layer is an interlayer dielectric layer made of “a silicon-based insulation material, which is commonly used at present” (para. 0075), but does not specifically state that the interlayer dielectric layer is an oxidized material. At the time of the invention, it would have been obvious to one of ordinary skill in the art to make the interlayer dielectric layer of Awano of silicon oxide because Awano states that the layer can be a well-known silicon-based insulation material and silicon oxide is the most commonly used and well-known interlayer insulation material used in integrated circuit devices.

### ***Allowable Subject Matter***

Claims 24 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The primary reason for the indication of the allowable subject matter of claims 24 and 25 is the inclusion therein, in combination as currently claimed, of the limitation of bring the nanoelement into contact with a suspension of catalyst material and removing the nanoelement from the suspension with a cluster attached thereto. This limitation is found in claims 24 and 25 and is neither disclosed nor taught by the prior art of record, alone or in combination.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Schlaf et al. (US 6,871,528) discloses forming a first nanotube, covering the end of the nanotube with a catalyst, and growing a second nanotube on the catalyst to produce a branched nanotube network (Fig. 9B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

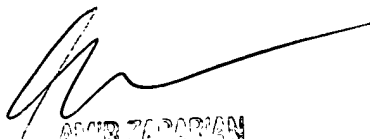
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN

May 2, 2005



AMIR Z. ZARIAN  
PATENT EXAMINER  
EBC/CENT 2010